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ATTORNEY DOCKET NO. 10990641-1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Inventor(s): WEBB, PETER G.

Serial No.: 09/359,527 **Examiner:** FORMAN, BETTY J

Filing Date: July 22, 1999 **Group Art Unit:** 1634

Title: METHODS OF FABRICATING AN ADDRESSABLE ARRAY OF BIOPOLYMER PROBES

COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF

Sir:

Transmitted herewith is the Appeal Brief in this application with respect to the Notice of Appeal filed on April 24, 2006.

The fee for filing this Appeal Brief is (37 CFR 1.17(c)) **$500.00.**

(complete (a) or (b) as applicable)

The proceedings herein are for a patent application and the provisions of 37 CFR 1.136(a) apply.

☐ (a) Applicant petitions for an extension of time under 37 CFR 1.136 (fees: 37 CFR 1.17(a)(1)-(5)) for the total number of months checked below:

☐	one month	$ 120.00
☐	two months	$ 450.00
☐	three months	$1020.00
☐	four months	$1590.00

☐ The extension fee has already been filled in this application.

☒ (b) Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

Please charge to Deposit Account **50-1078** the sum of $500.00. At any time during the pendency of this application, please charge any fees required or credit any overpayment to Deposit Account **50-1078** pursuant to 37 CFR 1.25.

A duplicate copy of this transmittal letter is enclosed.

☒ I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

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Signature: Susan Alessi

Respectfully submitted,

WEBB, PETER G.

By

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APPELLANTS' BRIEF Mail Stop Appeal Brief-Patents Commissioner for Patents P.O. Box 1450 Alexandria, VA 22313-1450		
	Attorney Docket No.	10990641-1
	Confirmation No.	2940
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	Application Number	09/359,527
	Filing Date	July 22, 1999
	Group Art Unit	1634
	Examiner Name	FORMAN, BETTY
	Title: "METHODS OF FABRICATING AN ADDRESSABLE ARRAY OF BIOPOLYMER PROBES"	

Sir:

This Brief is filed in support of Appellants' appeal from the Examiner's Final Rejection dated December 22, 2005. No claims have been allowed, and Claims 2-5, 8-14, 17, 49-52, and 55-57 are pending. Claims 2-5, 8-14, 17, 49-52, and 55-57 are appealed. A Notice of Appeal was filed on April 24, 2006.

The Board of Appeals and Interferences has jurisdiction over this appeal pursuant to 35 U.S.C. §134.

The Commissioner is hereby authorized to charge deposit account number 50-1078, reference no. 10990641-1 to cover any fee required under 37 C.F.R. §1.17(c) for filing Appellants' brief. In the unlikely event that the fee transmittal or other papers are separated from this document and/or other fees or relief are required, Appellants petition for such relief, including extensions of time, and authorize the Commissioner to charge any fees under 37 C.F.R. §§ 1.16, 1.17 and 1.21 which may be required by this paper, or to credit any overpayment, to deposit account number 50-1078, reference no. 10990641-1.

TABLE OF CONTENTS

REAL PARTY IN INTEREST

The inventors named on this patent application assigned their entire rights in the invention to Agilent Technologies, Inc.

RELATED APPEALS AND INTERFERENCES

An appeal is pending in Application Serial No. 09/302,898 which would directly affect or be directly affected by, or have a bearing on the Board's decision in the instant appeal.

STATUS OF CLAIMS

The present application was filed on July 22, 1999 with Claims 1-45. During prosecution, Claim 46-57 were added and Claims 1, 6, 7, 15, 16, and 18-48 were cancelled. Accordingly, Claims 2-5, 8-14, 17, 49-52, and 55-57 are pending in the present application, all of which claims are currently rejected and appealed herein.

STATUS OF AMENDMENTS

No amendments to the Claims were filed subsequent to issuance of the Final Rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

The claimed invention is drawn to a method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus and determined by a processor in communication with the deposition apparatus, provides the probes on the substrate in the target array pattern.

Below is a description of each appealed claim. Where support for each claim can

be found in the specification is listed in parentheses, is given as exemplary, and is not intended to be exhaustive.

Independent Claim 10 claims a method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus and determined by a processor in communication with the deposition apparatus, provides the probes on the substrate in the target array pattern. The method includes examining at least one operating parameter of the apparatus for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited. When an error is detected, a corrected drive pattern different from the target drive pattern is derived, based on the error, such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns. The deposition is then operated according to the corrected drive pattern, wherein the deposition apparatus includes a dispensing head with multiple nozzles to dispense fluid droplets containing the probes or probe precursors, and a transport system to move at least one of the dispensing head and substrate relative to the other as the droplets are dispensed from the head, so as to form the array; the drive pattern controls operation of the transport system; and the at least one operating parameter includes the position of the substrate or dispensing head, or orientation of a nozzle, and is examined by viewing the dispensing head, or nozzle, or a droplet pattern previously dispensed from the head. (See the specification, pg. 4, lines 8-12 and 21-28.)

Claim 2 depends from Claim 10 and specifies that additionally the deposition apparatus is operated according to the corrected drive pattern. (See the specification pg 14, line 13.)

Claim 3 depends from Claim 10 and specifies that the probes are DNA probes or RNA probes. (See the specification pg 4, line 4.)

Claim 4 depends from Claim 10 and specifies that additionally the target drive is saved in the memory of the deposition apparatus. (See the specification pg 4,

lines 6 and 7.)

Claim 5 depends from Claim 10 and specifies that additionally the target drive is saved in the memory of the deposition apparatus and the corrected drive pattern is saved in the memory. (See the specification pg 4, lines 6-8.)

Independent Claim 8 claims a method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus and determined by a processor in communication with the deposition apparatus, provides the probes on the substrate in the target array pattern. The method includes examining at least one operating parameter of the apparatus for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited. When an error is detected, a corrected drive pattern different from the target drive pattern is derived, based on the error, such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns. The deposition is then operated according to the corrected drive pattern, wherein the deposition apparatus includes a dispensing head to dispense fluid droplets containing the probes or probe precursors, and a transport system to move at least one of the dispensing head and substrate relative to the other as the droplets are dispensed from the head, so as to form the array; the drive pattern controls operation of the transport system; and the at least one operating parameter is the position of the dispensing head, which is examined by viewing the dispensing head. (See the specification, pg 4, lines 8-12 and 21-28.)

Claim 9 depends from Claim 8 and specifies that the operating parameter is examined by viewing a fiducial mark on the dispensing head. (See the specification pg 8, line 23.)

Claim 11 depends from Claim 4 and specifies that additionally the target drive pattern is saved in a memory of a processor in communication with the deposition apparatus, and the corrected drive pattern is saved in the memory, prior to operating the dispensing head and transport system to form the array. (See the specification

pg 4; line 13.)

Claim 12 depends from Claim 4 and specifies that additionally the target drive pattern is saved in a memory of a processor in communication with the deposition apparatus, and the corrected drive pattern is derived by modifying, based on the detected error, instructions to at least one deposition apparatus component based on the target drive pattern during operation of the dispensing head and transport system to form the array. (See the specification pg 4; lines 14-17.)

Claim 13 depends from Claim 10 and specifies that the at least one operating parameter is examined by viewing the droplet pattern previously dispensed from the head. (See the specification pg 4; line 33.)

Claim 14 depends from Claim 10 and specifies that the at least one operating parameter is a position of the dispensing head. (See the specification pg 4; line 23.)

Independent Claim 17 claims a method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus and determined by a processor in communication with the deposition apparatus, provides the probes on the substrate in the target array pattern. The method includes examining at least one operating parameter of the apparatus for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited. When an error is detected, a corrected drive pattern different from the target drive pattern is derived, based on the error, such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns. The deposition is then operated according to the corrected drive pattern, wherein the deposition apparatus includes a dispensing head with multiple nozzles to dispense fluid droplets containing the probes or probe precursors, and a transport system to move at least one of the dispensing head and substrate relative to the other as the droplets are dispensed from the head, so as to form the array; the drive pattern controls operation of the transport system; and the at least one operating parameter is a position of a nozzle which is examined by viewing the nozzle, or a droplet pattern

previously dispensed from the head. (See the specification, pg. 4, lines 8-12 and 21-28.)

Independent Claim 49 claims a method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus and determined by a processor in communication with the deposition apparatus, provides the probes on the substrate in the target array pattern. The method includes examining at least one operating parameter of the apparatus for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited. When an error is detected, a corrected drive pattern different from the target drive pattern is derived, based on the error, such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns. The deposition is then operated according to the corrected drive pattern to fabricate the array, wherein the operating parameter is a fluid volume dispensed by the deposition apparatus. (See the specification, pg. 4, lines 8-12 and 21-28 and pg 15, line 4.)

Independent Claim 50 claims a method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus and determined by a processor in communication with the deposition apparatus, provides the probes on the substrate in the target array pattern. The method includes examining at least one operating parameter of the apparatus for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited. When an error is detected, a corrected drive pattern different from the target drive pattern is derived, based on the error, such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns. The deposition is then operated according to the corrected drive pattern to fabricate the array, wherein the operating parameter is a position of a component which varies due to thermal

expansion. (See the specification, pg. 4, lines 8-12 and 21-28 and pg 3, lines 8 and 9.)

Independent Claim 51 claims a method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus and determined by a processor in communication with the deposition apparatus, provides the probes on the substrate in the target array pattern. The method includes examining at least one operating parameter of the apparatus for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited. When an error is detected, a corrected drive pattern different from the target drive pattern is derived, based on the error, such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns. The deposition is then operated according to the corrected drive pattern, wherein the deposition apparatus includes a dispensing head to dispense fluid droplets containing the probes or probe precursors, and a transport system to move at least one of the dispensing head and substrate relative to the other as the droplets are dispensed from the head, so as to form the array. The apparatus further includes an encoder to provide data on the location of the substrate or head, and the at least one operating parameter is an encoder error. (See the specification, pg 4, lines 8-12 and 21-28.)

Independent Claim 52 claims a method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus and determined by a processor in communication with the deposition apparatus, provides the probes on the substrate in the target array pattern. The method includes examining at least one operating parameter of the apparatus for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited. When an error is detected, a corrected drive pattern different from the target drive pattern is derived,

based on the error, such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns. The deposition is then operated according to the corrected drive pattern, wherein the deposition apparatus includes a dispensing head with multiple nozzles to dispense fluid droplets containing the probes or probe precursors, and a transport system to move at least one of the dispensing head and substrate relative to the other as the droplets are dispensed from the head, so as to form the array; the drive pattern controls operation of the transport system; and the at least one operating parameter is the position of the dispensing head, or orientation of a nozzle, and is examined by viewing the dispensing head, or nozzle. (See the specification, pg. 4, lines 8-12, 21-28 and 31-33.)

Claim 55 depends from Claim 49 and specifies that the deposition apparatus comprises multiple jets for dispensing droplets, and the corrected pattern is provided by a processor in communication with the deposition apparatus which provides an instruction to switch to a different jet when a deviation from nominal volume is encountered for one jet which is more than a predetermined tolerance. (See the specification, pg. 15, lines 14 and 15.)

Independent Claim 56 claims a method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus and determined by a processor in communication with the deposition apparatus, provides the probes on the substrate in the target array pattern. The method includes examining at least one operating parameter of the apparatus for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited. When an error is detected, a corrected drive pattern different from the target drive pattern is derived, based on the error, such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns. The deposition is then operated according to the corrected drive pattern to form the array, wherein the same error affects less than all of the array features. (See the specification, pg 15,

lines 16-18.)

Claim 57 depends from Claim 10 and specifies that the same error affects less than all of the array features. (See the specification, pg 15, lines 16-18.)

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 2-5, 8-14, 17, 49-52, and 55-57 stand rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Baldeschwieler et al. (US Patent No. 6,015,880) in view of Weber et al. (US Patent No. 4,328,504).

ARGUMENTS

In maintaining the rejection under § 103 the Examiner has employed the Weber et al. patent, which is clearly drawn to subject matter that is non-analogous to that of the primary document, Baldeschwieler et al.

In the following sections, the Appellants will demonstrate why the Examiner's *prima facie* case of obviousness is deficient. Specifically, it is respectfully submitted that the Examiner's *prima facie* case of obviousness is deficient because the Examiner has combined improperly two patents from non-analogous arts. In addition, the Appellants were the first to identify and solve a specific problem in the manufacturing of biopolymer arrays, a fact which is a basis for unobviousness over the cited documents. Below are the contentions of the Appellants with respect to the ground of rejection.

The claims will be argued as five groups, namely

Group I: Claims 2-5, 8-14, 17, and 52
Group II: Claims 49 and 55
Group III: Claim 50
Group IV: Claim 51

Group V: Claims 56 and 57.

I. Claims 2-5, 8-14, 17, 49-52, and 55-57 are not obvious under 35 U.S.C. § 103(a) over Baldeschwieler et al. (US Patent No. 6,015,880) in view of Weber et al. (US Patent No. 4,328,504).

With respect to rejections made under 35 U.S.C. § 103, MPEP § 2142 states:

> To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

Group I: Claims 2-5, 8-14, 17, and 52

The claims of this group specify that the deposition apparatus includes a dispensing head with multiple nozzles.

The Examiner's rationale for making this rejection is that Baldeschwieler et al. discloses a method for fabricating biopolymer arrays, which method employs an ink jet device for reagent deposition. Baldeschwieler et al., however, is deficient for not disclosing the correction of errors in the deposition process so as to reduce discrepancies between an actual and a target pattern.

Weber et al. was cited by the Examiner in an effort to remedy the deficiency of Baldeschwieler et al. However, Weber et al. is drawn to correction of printing errors when printing ink is deposited onto paper, and not to correction of errors associated with the deposition of aqueous biopolymers or precursors thereof onto a surface in order to produce an array that is useful in biotechnological applications.

Therefore, one would not have expected the problems faced by Weber et al. to be reasonably pertinent either to those faced by Baldeschwieler et al. or to those faced by the Appellants. The technical field of Weber et al. is from an art that is non-analogous to the art of Baldeschwieler et al. Baldeschwieler et al. does not use printing ink whereas Weber et al. does, and Baldeschwieler et al. is not printing onto paper whereas Weber et al. is.

The Examiner has asserted only that both Baldeschwieler et al. and Weber et al. employ ink jet devices, which allegedly makes the two documents analogous. This assertion by the Examiner is inconsistent with the criteria for analogous art set forth in MPEP § 2141.01(a), namely:

> 'In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned.' *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). See also *In re Deminski*, 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986); *In re Clay*, 966 F.2d 656, 659, 23 USPQ2d 1058, 1060-61 (Fed. Cir. 1992) ('A reference is reasonably pertinent if, even though it may be in a different field from that of the inventor's endeavor, it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his problem.'); *Wang Laboratories Inc. v. Toshiba Corp.*, 993 F.2d 858, 26 USPQ2d 1767 (Fed. Cir. 1993); and *State Contracting & Eng'g Corp. v. Condotte America, Inc.*, 346 F.3d 1057, 1069, 68 USPQ2d 1481, 1490 (Fed. Cir. 2003) (where the general scope of a reference is outside the pertinent field of endeavor, the reference may be considered analogous art if subject matter disclosed therein is relevant to the particular problem with which the inventor is involved).

Conventional ink jet printing of printing ink onto paper would not logically commend itself to an inventor in the biopolymer array art in considering problems with making arrays via deposition of biopolymers because printing ink onto paper is so completely different from depositing chemical reagents onto a substrate to make microarrays. Differences between the two applications are multitude and include different types of materials employed. For example, conventional printing employs ink and the methods of claimed invention employ nucleic acid monomer reagent. In addition, the protocols are different. For example, use of conventional ink is a single pass process. In contrast, the claims are directed to fabrication of biopolymer arrays, where a plurality of passes, and various conditions, are required to build up

the nucleic acid polymers. Differences further extend to the end products, where the end product in conventional ink jet printing is a printed page and the end product of the present application is a nucleic acid array. Furthermore, conventional ink jet printing is in a completely different field of endeavor from the present application, where ink jet printing is in the field of publishing and the claims of the present application are directed to fabrication of nucleic acid arrays for use in biotechnological assay applications.

Nor would the particular problems with conventional ink printing onto paper be reasonably pertinent to making biopolymer arrays. As such, Weber et al is not properly combinable with Baldeschwieler et al. Accordingly, a *prima facie* case of obviousness has not been established. Appellants respectfully request withdrawal of this rejection.

In addition to the fact that the cited documents are not combinable for the reasons set forth above, Appellants emphasize that they were the first to recognize a specific problem in the fabrication of biopolymer arrays, and that they then succeeded in solving that problem. Specifically, the present invention is directed to the problem in which positive features during an array assay nonetheless give rise to a weak signal that may be difficult to distinguish from background, particularly at the feature border. This problem can become exaggerated when the array pattern of a given array is different from the target array pattern according to which the array was fabricated due to errors arising during the manufacture process.

As such, it is desirable during the manufacture of an array to ensure that any discrepancy between an actual array pattern and the target array pattern according to which it was fabricated be kept at a minimum. Such is desirable so that, during use, one can know precisely where features of the array are located. These problems were not appreciated by Baldeschwieler et al. or Weber et al.

Recognition by Appellants of a problem in the art and solving that problem are

a basis for a determination of the unobviousness of Appellants' claimed invention. "[Where] there is no evidence of record that a person of ordinary skill in the art at the time of [an applicant's] invention would have expected [a problem] ... to exist at all, it is not proper to conclude that [an invention] ... which solves this problem ... would have been obvious to that hypothetical person of ordinary skill in the art." *In re Peehs*, 612 F.2d 1287, 1290, 204 USPQ 835 (CCPA 1980) (citing *In re Nomiya*, 509 F.2d 566, 572, 184 USPQ 607, 612-13 (CCPA 1975))(emphasis added).

The Examiner has not established that the problem in the biopolymer array art that was recognized and solved by the Applicants was known or expected *in the biopolymer array art*. It is her burden to do so, but in the Advisory Action mailed March 15, 2006, she has required an affidavit or declaration from the Appellants. The quotation from *Peehs* above implies that the evidence of record must be supplied by the Examiner, for it is the Examiner who makes the conclusion of obviousness. Absent that evidence, a conclusion of obviousness by the Examiner is improper.

Moreover, the secondary considerations listed by the Examiner in the Advisory Action that require an affidavit or declaration do not include recognition and solution of a problem in the art. Appellants' specification, for example at the paragraph bridging pages 2 and 3, is a disclosure of Appellants' recognition of the problem; the remainder of the specification discloses the solution. Appellants have already signed a declaration that they have reviewed and understood the contents of their specification. A further declaration by Appellants is therefore unnecessary.

The Appellants also reiterate that without an appreciation of the problem solved by the present invention, there would have been no motivation to combine the teachings of Baldeschwieler et al. and Weber et al. to arrive at the claimed invention because there would have been no motivation to look to non-analogous art to solve an unrecognized problem in the biopolymer array art. Without knowledge of the problem, there would have been no need to combine the documents, the expense of making the combination would be high, and there would have been no

expected benefit to making the combination.

Furthermore, one would not have been motivated to go the extra step of correcting for errors so as to reduce discrepancies between the actual and target array pattern, because one would not have appreciated that such discrepancies would occur or further that such discrepancies, if present, would have any effect on the usability of the array. In fact, one of skill in the art would not have been motivated to modify Baldeschwieler et al. because any such modification would have added to the expense of the process without yielding any benefit.

Therefore, for the additional reason that there would have been no motivation to combine the teachings of Baldeschwieler et al. and Weber et al., a *prima facie* case of obviousness has not been established.

Appellants respectfully request withdrawal of this rejection.

Group II: Claims 49 and 55

The claims of this group specify that the operating parameter is a fluid volume dispensed by the deposition apparatus.

In addition to the arguments detailed above for the Claims of Group I, Appellants further submit that neither Baldeschwieler et al. nor Weber et al. teaches or suggests that the operating parameter is a fluid volume dispensed by the deposition apparatus.

As described in the specification, to correct for a volume below an expected volume (that is, the nominal volume) produced by the jets producing features 16b, the actual drive image will contain an instruction for that jet to fire multiple spots or with more energy (this appearing as enlarged features 16b in FIG. 8) to compensate for the low volume error. Alternatively, the actual drive image can be an instruction

to switch to a different jet in the head when a deviation from nominal volume is encountered, which may be more than a predetermined tolerance, and to compensate for the different position of the different jet accordingly.

Baldeschwieler et al. is not concerned with errors, and Weber et al. does not address the issue of fluid volume. Accordingly, because the combination of the teachings of Baldeschwieler et al. and Weber et al. fails to teach or suggest each and every element of the claim of this group, Appellants respectfully request withdrawal of this rejection.

Group III: Claim 50

The claim of this group specifies that the operating parameter is a position of a component which varies due to thermal expansion.

In addition to the arguments detailed above for the Claims of Group I, Appellants further submit that neither Baldeschwieler et al. nor Weber et al. teaches or suggests that the operating parameter is a position of a component which varies due to thermal expansion.

As described in the specification, substrate 10, either encoder 30, 34, transporter 60, and carriage 62 may suffer from thermal expansion. Baldeschwieler et al. is not concerned with errors, and Weber et al. does not address the issue of thermal expansion of components.

Accordingly, because the combination of the teachings of Baldeschwieler et al. and Weber et al. fails to teach or suggest each and every element of the claim of this group, Appellants respectfully request withdrawal of this rejection.

Group IV: Claim 51

The claim of this group specifies that the at least one operating parameter is an encoder error.

In addition to the arguments detailed above for the Claims of Group I, Appellants further submit that neither Baldeschwieler et al. nor Weber et al. teaches or suggests that the at least one operating parameter is an encoder error.

As described in the specification, an error in the accuracy of an encoder used to detect the position of the dispensing head or the substrate will cause the encoder to report an incorrect position. Baldeschwieler et al. is not concerned with errors, and Weber et al. does not address the issue of encoder error.

Accordingly, because the combination of the teachings of Baldeschwieler et al. and Weber et al. fails to teach or suggest each and every element of the claim of this group, Appellants respectfully request withdrawal of this rejection.

Group V: Claims 56 and 57

The claims of this group specify that the same error affects less than all array features.

In addition to the arguments detailed above for the Claims of Group I, Appellants further submit that neither Baldeschwieler et al. nor Weber et al. teaches or suggests that the same error affects less than all array features.

As described in the specification, some errors may relate to individual spots and some relate to all spots. Baldeschwieler et al. is not concerned with errors, and Weber et al. does not address the issue of errors in some versus all spots.

Accordingly, because the combination of the teachings of Baldeschwieler et al. and Weber et al. fails to teach or suggest each and every element of the claim of this group, Appellants respectfully request withdrawal of this rejection.

SUMMARY

Claims 2-5, 8-14, 17, 49-52, and 55-57 are not unpatentable under 35 U.S.C. § 103(a) over Baldeschwieler et al. (US Patent No. 6,015,880) in view of Weber et al. (US Patent No. 4,328,504) because Baldeschwieler et al. does not disclose the correction of errors in a process for the deposition of aqueous biopolymers or precursors thereof so as to reduce discrepancies between an actual and a target pattern, and Weber et al. does not remedy the deficiency of Baldeschwieler et al.

RELIEF REQUESTED

The Appellants respectfully request that the rejection of Claims 2-5, 8-14, 17, 49-52, and 55-57 under 35 U.S.C. § 103(a) be reversed, and that the application be remanded to the Examiner with instructions to issue a Notice of Allowance.

Respectfully submitted,

Date: June 20, 2006 By: _____

Richard A. Schwartz
Registration No. 48,105

Date: June 20, 2006 By: _____

Bret Field
Registration No. 37,620

AGILENT TECHNOLOGIES, INC.
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Claims Appendix

2. A method according to claim 10, additionally comprising operating the deposition apparatus according to the corrected drive pattern.

3. A method according to claim 10 wherein the probes are DNA or RNA probes.

4. A method according to claim 10 additionally comprising saving the target drive pattern in a memory of the deposition apparatus.

5. A method according to claim 10 additionally comprising saving the target drive pattern in a memory of the deposition apparatus, and wherein the corrected drive pattern is saved in the memory.

8. A method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus and determined by a processor in communication with the deposition apparatus, provides the probes on the substrate *in* the target array pattern, the method comprising:

(a) examining at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited;

(b) when an error is detected deriving, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns; and

(c) operating the deposition apparatus according to the corrected drive pattern so as to fabricate the array;

wherein:

the deposition apparatus includes a dispensing head to dispense fluid droplets containing the probes or probe precursors, and a transport system to move at least one of the dispensing head and substrate relative to the other as the droplets are dispensed from the head, so as to form the array;

the drive pattern controls operation of the transport system; and

the operating parameter is the position of the dispensing head, which is examined by viewing the dispensing head.

9. A method according to claim 8 wherein the operating parameter is examined by viewing a fiducial mark on the dispensing head.

10. A method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus and determined by a processor in communication with the deposition apparatus, provides the probes on the substrate in the target array pattern, the method comprising:

(a) examining at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited;

(b) when an error is detected deriving, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns; and

(c) operating the deposition apparatus according to the corrected drive pattern so as to fabricate the array;

wherein:

the deposition apparatus includes a dispensing head with multiple nozzles to dispense fluid droplets containing the probes or probe precursors, and a transport system to move at least one of the dispensing head and substrate relative to the other as the droplets are dispensed from the head, so as to form the array;

the drive pattern controls operation of the transport system;

the at least one operating parameter is the position of the substrate or dispensing head, or orientation of a nozzle, and is examined by viewing the dispensing head, or nozzle, or a droplet pattern previously dispensed from the head.

11. A method according to claim 4 additionally comprising saving the target drive pattern in a memory of a processor in communication with the deposition apparatus, and wherein the corrected drive pattern is saved in the memory, prior to operating the dispensing head and transport system to form the array.

12. A method according to claim 4 additionally comprising saving the target drive pattern in a memory of a processor in communication with the deposition apparatus, and wherein the corrected drive pattern is derived by modifying, based on the detected error, instructions to at least one deposition apparatus component based on the target drive pattern during operation of the dispensing head and transport system to form the array.

13. A method according to claim 10 wherein the at least one operating parameter is examined by viewing the droplet pattern previously dispensed from the head.

14. A method according to claim 10 wherein the at least one operating parameter is a position of the dispensing head.

17. A method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating

parameters of the apparatus and determined by a processor in communication with the deposition apparatus, provides the probes on the substrate in the target array pattern, the method comprising:

(a) examining at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited;

(b) when an error is detected deriving, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns; and

(c) operating the deposition apparatus according to the corrected drive pattern so as to fabricate the array;

wherein:

the deposition apparatus includes a dispensing head with multiple nozzles to dispense fluid droplets containing the probes or probe precursors, and a transport system to move at least one of the dispensing head and substrate relative to the other as the droplets are dispensed from the head, so as to form the array;

the drive pattern controls operation of the transport system;and

wherein the at least one parameter is a position of a nozzle which is examined by viewing the nozzle, or a droplet pattern previously dispensed from the head.

49. A method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus and determined by a processor in communication with the deposition apparatus, provides the probes on the substrate in the target array pattern, the method comprising:

(a) examining at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited;

(b) when an error is detected deriving, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns; and

(c) operating the deposition apparatus according to the corrected drive pattern so as to fabricate the array;

wherein the operating parameter is a fluid volume dispensed by the deposition apparatus.

50. A method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus and determined by a processor in communication with the deposition apparatus, provides the probes on the substrate in the target array pattern, the method comprising:

(a) examining at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited;

(b) when an error is detected deriving, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns; and

(c) operating the deposition apparatus according to the corrected drive pattern so as to fabricate the array;

wherein the operating parameter is a position of a component which varies due to thermal expansion.

51. A method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus and determined by a processor in communication with

the deposition apparatus, provides the probes on the substrate in the target array pattern, the method comprising:

(a) examining at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited;

(b) when an error is detected deriving, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array patterns; and

(c) operating the deposition apparatus according to the corrected drive pattern so as to fabricate the array;

wherein:

the deposition apparatus includes a dispensing head to dispense fluid droplets containing the probes or probe precursors, and a transport system to move at least one of the dispensing head and substrate relative to the other as the droplets are dispensed from the head, so as to form the array;

the apparatus further includes an encoder to provide data on the location of the substrate or head; and

the at least one operating parameter is an encoder error.

52. A method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus and determined by a processor in communication with the deposition apparatus, provides the probes on the substrate in the target array pattern, the method comprising:

(a) examining at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited;

(b) when an error is detected deriving, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive

pattern results in a reduced discrepancy between the target and actual array patterns; and

(c) operating the deposition apparatus according to the corrected drive pattern so as to fabricate the array;

wherein:

the deposition apparatus includes a dispensing head with multiple nozzles to dispense fluid droplets containing the probes or probe precursors, and a transport system to move at least one of the dispensing head and substrate relative to the other as the droplets are dispensed from the head, so as to form the array;

the drive pattern controls operation of the transport system; the operating parameter is the position of the dispensing head, or orientation of a nozzle, and is examined by viewing the dispensing head, or nozzle.

55. A method according to claim 49 wherein the deposition apparatus comprises multiple jets for dispensing droplets, and wherein the corrected pattern is provided by a processor in communication with the deposition apparatus which provides an instruction to switch to a different jet when a deviation from nominal volume is encountered for one jet which is more than a predetermined tolerance.

56. A method of fabricating an addressable array of biopolymer probes on a substrate according to a target array pattern using a deposition apparatus which, when operated according to a target drive pattern based on nominal operating parameters of the apparatus and determined by a processor in communication with the deposition apparatus, provides the probes on the substrate in the target array pattern, the method comprising:

(a) examining at least one operating parameter for an error from a nominal value which error will result in use of the target drive pattern producing a discrepancy between the target array pattern and an actual array pattern deposited;

(b) when an error is detected deriving, based on the error, a corrected drive pattern different from the target drive pattern such that use of the corrected drive pattern results in a reduced discrepancy between the target and actual array

patterns; and

(c) operating the deposition apparatus according to the corrected drive pattern so as to fabricate the array;

wherein the same error affects less than all of the array features.

57. A method according to claim 10 wherein the same error affects less than all of the array features.

EVIDENCE APPENDIX

No evidence submitted under 37 CFR §§ 1.130, 1.131 or 1.132 has been relied upon by Appellants in this Appeal.

RELATED PROCEEDINGS APPENDIX

There are no decisions rendered by a court or the Board which would directly affect or be directly affected by, or have a bearing on the Board's decision in the instant appeal.